## AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior revisions and listings, of claims in the present application.

## LISTING OF CLAIMS

1. (Currently Amended) A method of registering ladar data, comprising:
receiving a plurality of ladar frames; and
registering at least two of said plurality of ladar frames for determining a sensor pose with respect to a reference, said registering step comprises performing a coarse search for determining a translation shift, wherein said performing said coarse search comprises constructing range images from point sets derived from said at least two ladar frames, estimating a 2D image shift from said at least two ladar frames, scaling said 2D image shift for generating said translation shift in cross-range directions and estimating said translation shift in a down-range direction from said at least two ladar frames.

2. (Original) The method of claim 1, wherein said registering step uses information provided by a Global Positioning System (GPS) or Inertial Navigation System (INS).

3. (Currently Amended) The method of claim 1, wherein said registering step further comprises:
~~performing a coarse search for determining a translation shift; and~~
performing a fine registration.

4. (Canceled)

5. (Currently Amended) The method of claim 3 1, wherein performing said coarse search comprises:

binning point sets from each frame of said at least two ladar frames into coarse 3D grids of binary voxels; and

correlating the grids for generating said translation shift.

6. (Original) The method of claim 3, wherein performing said fine registration employs an iterated closest points (ICP) method.

7. (Original) The method of claim 6, wherein said ICP method performs a bounds test for eliminating false matches.

8. (Original) The method of claim 6, wherein said ICP method is accelerated by using an extrapolated point to compute motion.

9. (Original) The method of claim 6, wherein said ICP method removes points in either ladar frame on an interior of a smooth densely sampled surface from consideration.

10. (Original) The method of claim 6, wherein said ICP method ignores closest point pairs within said at least two ladar frames with distance exceeding a limit.

11. (Original) The method of claim 6, wherein said ICP method incrementally estimates rotation and translation from point pairs of said at least two ladar frames.

12. (Original) The method of claim 11, wherein translation is estimated as $\Delta T = median\{q_k - (Rp_k + T)\}$, a robust center of translation-corrected points $c_k = R_{pk} + T + \Delta T$ is computed as $\mu = \text{median}\{c_k\}$, and rotation around each axis is estimated from median $\{\angle_x(c_k - \mu), (q_k - \mu)\}$ where $\angle_x a, b$ denotes the angle between vectors projected onto the $yz$ plane.

13. (Original) The method of claim 6, wherein said ICP method comprises:
    a) creating a point cloud from said at least two ladar frames at a plurality of resolution levels; and
    b) performing said ICP method at each of said plurality of resolution levels.

14. (Original) The method of claim 1, wherein said sensor pose is determined using a hierarchical approach, where groups of nearby ladar frames are first registered and then are aggregated into composite point sets.

15. (Original) The method of claim 1, wherein said sensor pose is determined using a bundle approach, where pairwise registration is performed on said plurality of ladar frames separated by different temporal distances.

16. (Original) The method of claim 15, wherein a visual representation of said at least two ladar frames is produced.

17. (Original) The method of claim 1, wherein static noise cleaning is performed before said registering step.

18. (Original) The method of claim 1, wherein dynamic noise cleaning is performed before said registering step.

19. (Withdrawn)

20. (Withdrawn)

21. (Withdrawn)

22. (Withdrawn)

23 (Withdrawn)

24 (Withdrawn)

25. (Withdrawn)

26. (Withdrawn)

27. (Canceled)

28. (Currently Amended) An apparatus for registering ladar data, comprising:

means for receiving a plurality of ladar frames; and

means for registering at least two of said plurality of ladar frames for determining a sensor pose with respect to a reference, said means for registering comprises means for performing a coarse search for determining a translation shift, wherein said means for performing said coarse search comprises means for constructing range images from point sets derived from said at least two ladar frames, means for estimating a 2D image shift from said at least two ladar frames, means for scaling said 2D image shift for generating said translation shift in cross-range directions, and means for estimating said translation shift in a down-range direction from said at least two ladar frames.

29. (Currently Amended) The apparatus of claim 28, wherein said means for registering further comprises:

~~means for performing a coarse search for determining a translation shift; and~~

means for performing a fine registration.

30. (Canceled)

31. (Currently Amended) The apparatus of claim ~~29~~ 28, wherein said means for performing said coarse search further comprises:

means for binning point sets from each frame of said at least two ladar frames into coarse 3D grids of binary voxels; and

means for correlating the grids for generating said translation shift.

32. (Canceled)

33. (Withdrawn)